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ABSTRACT

The literature pertaining to the processes and methods of curriculum design and evaluation in higher education is widely scattered and not in the form most useful to those designing curriculum. This monograph identifies many of these resources and discusses them in terms of their practical use. Case studies are used to illustrate the use of the techniques in higher education. In some sections, checklists are provided for use by groups of faculty members assessing the need for a new or revised curriculum or for designing, implementing, and evaluating a new curriculum. Throughout, the interactive, interrelated nature of the design and evaluation processes is stressed, showing that each process implies or anticipates another when approached systematically. (Author/MSE)

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Designing and Evaluating Higher Education Curricula

Lynn Wood and Barbara Gross Davis

AAHE-ERIC/Higher Education
Research Report No. 8
1978

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Foreword

The curriculum in higher education has been described as "a systematic group of courses or sequences of subjects required for graduation or certification in a major field of study" (*Dictionary of Education,* Carter V. Good, ed.) and as "all the experience which a pupil has under the guidance of the school" (*Encyclopedia of Education,* Edward Blishen, ed.). In 1977-78, approximately one-half million faculty members taught over 2 million classes to more than 10 million students in more than 3,000 institutions that offered over 1,500 separate degrees. The ambiguity in defining what makes up the curriculum, coupled with the incredibly vast array of course and degree offerings, has made curricula designing and evaluation a Gordian knot.

To the valiant and courageous who attempt to develop some systematic order out of the chaotic collection of courses and activities that comprises the student's education there comes the quick realization that the forces that shape the curriculum are both external as well as internal. As identified by the Carnegie Foundation for the Advancement of Teaching (1977), the external forces include areas such as:

General Influences
- The public
- Communication media
- Churches

Intellectual and Academic Influences
- New knowledge
- Learned and professional schools
- Textbooks
- Foundations

Regulations
- Governments
- Accrediting agencies
- Courts
- Collective bargaining

Opportunities for Graduation
- Profession and Occupation
- Graduate and professional schools

Inputs
- High school contributions
- Budgets

Procedural Influences
- Transfer students
- Competition

The internal areas include:

- Academic departments
- Colleges and other academic divisions
- The president and academic deans
- Individual faculty members
- The students
- The extra curriculum

It is usually the external influences that are the sources of pressure for curriculum change. Yet it is the internal forces that determine the direction and extent of the change; and within these internal forces it is the individual faculty member who determines the quality of these changes.

The goal assumed by Lynn Wood, assistant director, and Barbara Gross Davis, assistant research psychologist at Teaching and Evaluation Services of the University of California, Berkeley was to develop a Research Report that could be used by faculty and administrators to evaluate their current curriculum, to assess the rationale behind the influences that promote curricular change, and to design and implement new courses and programs. This report was not intended to be the definitive handbook on curriculum design and evaluation but to provide a firm basis for those who are just beginning to involve themselves in the evaluation of their program or their institutional curriculum. The authors have accomplished their goal with a high degree of competence.

Jonathan D. Fife, Director
ERIC Clearinghouse on Higher Education

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Overview

Nature, Purpose, and Scope of the Study

As consultants to the faculty of the University of California, Berkeley, increasingly we are requested to assist faculty members in designing and evaluating their curricula. We have been asked to recommend examples, models and strategies and to help develop workable designs and evaluation instruments. Our interest in curriculum design and evaluation, therefore, is largely pragmatic. Because our faculty clients vary considerably in their academic disciplines, educational philosophies, and their curricular needs, our interests also tend to be eclectic. Both the pragmatism and the eclecticism are reflected in this monograph.

Although we have drawn on useful concepts and models in the published literature, we also made a special attempt to track down the more "fugitive" reports of recent curriculum design and evaluation efforts in colleges and universities across the nation. A better understanding of the "state of the art" as practiced in institutions of higher education might be more instructive than the theoretical literature on curriculum and on evaluation, which frequently neglects the "real-world" constraints facing those involved in curriculum change. This practical emphasis reflects our decision to write the monograph for faculty members, administrators, and others directly involved in curriculum design and evaluation.

Case study examples were identified through: an ERIC search, correspondence with scholarly and professional associations, faculty development and teaching improvement centers in colleges and universities, state postsecondary commissions and coordinating councils, foundations, and published inventories of instructional improvement efforts on a number of college and university campuses. We wish to thank the many individuals, institutions, and organizations who contributed to our findings.

Curriculum Design and Evaluation: A Neglected Field

During the past ten years, the higher education community has begun to take a greater interest in questions of instructional design and evaluation. The emphasis on "instructional design"—as a systematic approach to course development—has grown largely out of the need to respond to a larger and more heterogeneous group of stu-

dents in institutions of higher education. Accordingly, the forms of instructional design have tended to emphasize *individualized* approaches to instruction. Self-paced, mastery learning, and audio-tutorial approaches are examples, as are experiential learning programs and the assessment of community and work experience for college credit.

During the same period, nearly all aspects of college and university functioning have undergone changes to make them more rational, visible, and accountable. Much attention has been given to finding more systematic ways of determining budgets, more cost-effective ways of delivering instruction, and more reliable and valid approaches to evaluating teaching. These quests continue today. Until very recently, however, one aspect of higher education has all but escaped these attempts to more systematically design instruction and evaluate its outcome or merits. That area is the *curriculum*.

This is not to say that higher education curricula have been totally neglected. The literature on undergraduate curricula—especially that focusing on the relative merits of general versus specialized education and liberal versus career education—has received a good deal of attention in recent years. In addition, a number of excellent books have been written on the history and current state of curricula in American colleges and universities (e.g., Levine 1978; Rudolph 1977; Carnegie Foundation 1977; and Brubacher and Rudy 1976). Curriculum developments in several disciplines and professions have also been addressed (Cheit 1975; Kaysen 1973), as have curriculum reforms and innovations in specific colleges and universities (Belknap and Kuhns 1977; Levine and Weingart 1973; Gaff et al. 1970; Tussman 1969; Hefferlin 1969).

For the most part, these studies have been concerned with the content of curriculum changes and the personalities, groups, and social forces and ideologies that helped to shape them. Principles of curriculum design and methods of curriculum evaluation are almost nowhere to be found in the higher education literature.[1] Where they do exist, either they tend to be stated in very broad and abstract terms or they represent little more than a compendium of various methods and tools used in designing or evaluating single courses or instructional materials. Little attention has been given explicitly to

[1] The closest thing to a "handbook" of curriculum design and curriculum evaluation at the higher education level is the recently published *Developing the College Curriculum* (Chickering et al. 1977), which is in fact subtitled "A Handbook for Faculty and Administrators."

the problems of designing and evaluating the complex, integrated set of activities we generally associate with the concept of a curriculum.

Forman, Richardson, and Vallance (1976, pp. 1-3) have speculated on the reasons why the curriculum design and evaluation process is not well documented. First, there is general uncertainty as to what such documentation will tell us. Will it ultimately improve our design and evaluation efforts? Are curriculum development activities at a given institution generalizable enough to be of benefit to another institution? Second, time spent documenting the process is time spent away from the curriculum design and evaluation effort, which is, after all, the priority activity. Third, it is not exactly clear what should be documented. When does enough detail become too much detail? Can key decision points be identified at the time they occur? Since curriculum design and evaluation are not linear, but rather complex interacting activities, how can their process best be recorded? Finally, the objectivity of the people involved in curriculum design and evaluation process is always an issue. Can they separate their feeling for what should have happened with what actually did occur? These factors have all worked against systematic documentation efforts that might have provided design and evaluation models for others to follow.

Six Findings

Given that curriculum design and evaluation is a neglected field of study, what are we able to conclude from an examination of the literature and case study examples?

First, we know that most curriculum change is piecemeal, incremental, and unplanned with respect to the total curriculum. For the most part, what students are taught can be almost entirely explained by the size and composition of the faculty. Typically, curricula are built around the expertise and interests of the faculty, and curriculum change is the result of gradually adding new members to teach specific (and often new) courses.

Even though at certain points in the history of a college or department an overall curriculum design is developed, as a department adapts to changes in its discipline, turnover in its faculty, and shifts in the interests and preparation levels of its student body, revision tends to be directed at modifying the old structure through the addition and deletion of courses and course requirements. In time, if systematic evaluation and restructuring does not occur, the curriculum can become little more than a collection of courses that represent "the

institutionalized remains of earlier interests of professors, patrons, and students" (Hefferlin 1969, p. xxi).

Second, we know that for curriculum development activities to be undertaken, there needs to be some sense of dissatisfaction with the current curriculum, whether expressed internally by the faculty itself or externally by deans, presidents, program or accreditation reviews, students, legislatures, employers, or society at large. Without sufficient stimulus and reason for undertaking curriculum revision, faculty members will continue to teach their own courses and accord their colleagues the same privilege, without regard to the need for a coherent curriculum design.

The third thing we know about curriculum design and evaluation is that they are both complex, difficult undertakings. A curriculum, as distinct from a course, is a collective, rather than an individual effort, and precisely because it is everyone's responsibility, in an important sense it becomes no one's responsibility. As a recent study by the Carnegie Foundation (1977, p. 10) points out: "Faculty members pay attention to their individual courses, departments to their majors, and students to their choice of electives: but few persons, and sometimes none, pay attention to the . . . overall enterprise." The collective nature of a curriculum makes both its evaluation and its revision highly political acts, as well as complex intellectual activities.

Fourth, because curriculum development is a collective activity, it requires someone among the faculty to exercise leadership: to gain consensus about the need for a new curriculum; to select task forces or committees to look into curriculum options and develop a plan; to marshall support for the plan; to set deadlines and facilitate the work of the committees; to seek released time and/or funding when that is required; to undertake the various steps necessary to see that the curriculum plan is implemented within a reasonable time frame; and to generally take responsibility for solving problems as they occur. In many cases, this role is played by a dean or department chairman. The Hefferlin study (1969, p. 113) found that one of the most significant correlates of departmental curriculum change was the change in department chairmen.

Fifth, because the restructuring of a curriculum is such an arduous undertaking, we know that it tends to take many years to accomplish. In the case studies that we examined, five or six years were not uncommon, and some have taken even longer.

Sixth, we know that major curriculum development or revision is costly, both in faculty time and in institutional resources. In fact,

most of the major curriculum revision projects that we examined had been undertaken with fairly substantial amounts of governmental or foundation money. The more substantial the curriculum revision (especially those involving not only changes in content but in the format of instruction—such as competency-based education, self-paced mastery-learning approaches, or computer-assisted instruction), the more likely the project will require consultants and other staff outside the department or college to assist faculty with the curriculum design and implementation.

Higher Education Curricula Today

The dearth of a literature on systematic approaches to the design and evaluation of higher education curricula is not accidental. It reflects not only the invisible, elusive, and political nature of the design and evaluation process, but the status of the higher education curriculum itself. Although nearly all scholars and historians have noted the passing of anything that could be called *the* curriculum of higher education, a quotation from Rudolph (1977, p. 245) captures the difficulties inherent in studying a phenomenon that is no longer unitary, and far from static.

> In the twentieth century the curriculum fell apart. . . . The rise of science, the death of Greek, the emergence of professions, the ascendancy of an ambitious middle class, the resounding victory of intellect over piety—these were events that brought down into a thousand pieces the old college and all of the certainties and practices that had held it together. The death of the classical course of study opened the way to a curriculum burdened with such a diversity of purpose, style, and institutional form that the word curriculum became a concept of convenience rather than precision.

Veysey (1973, p. 1) refers to this change as "the only genuine 'academic revolution' yet to be experienced in the United States." Throughout the twentieth century, the diverse and fragmented curricula of higher education have continued to multiply. Even while some curricula have disappeared, still more have emerged. Furthermore, within each curriculum a slow but relentless change in course offerings and requirements continues to occur through accretion, attrition, and recombination or synthesis (Hefferlin 1969, pp. 24-34); so that, "today, the new coexists to a considerable extent with the old, for there has been little pruning and much grafting" (Carnegie Foundation 1977, p. 19).

Thus, one obstacle to the study of modern curriculum change has been its sheer volume and complexity. "Today there are over 2 million classes taught by half a million faculty members to about 10 million students in about 3,000 institutions. . . . There are over 1,500 separate degrees" (Carnegie Foundation 1977, p. 1). As Rudolph has pointed out:

> It is one thing to describe the curriculum under which Harvard for decade after decade awarded nothing but the B.A.; it is almost an affront

to the imagination to be expected to make sense of the 200 different degrees offered by the University of Illinois in 1960 (1977, p. 10).

Another related obstacle has been the fluidity of the course offerings and requirements that constitute a given curriculum even over a short period of time. For example, in analyzing course offerings during a five-year period, Hefferlin (1969, p. 54) found that by 1967 "the 110 institutions that we surveyed had reorganized or substituted, on the average, one out of every five courses that they had offered in 1962." Should the survey have covered the volatile years between 1968 and 1973, the extent of curricular change would no doubt have been even greater.

Because most curriculum change is both piecemeal and without regard for any overall curricular design, it tends to be unnoticed by all but a very few who are directly involved in its development. And because incremental changes in higher education, like gradual changes in any social institution, are rarely documented as change per se, they are seldom the object of study. Indeed, because such changes come about so gradually, frequently they are not recognized as changes at all.

Very recently, however, there has been a resurgence of interest in large-scale, holistic kinds of curriculum change. The reason is the growing sense of *dis*-ease about the fragmented and narrow education being received by most undergraduates. Today, whatever interest there is in questions of curriculum design and evaluation is due in large part to this renewed interest in the general education component of undergraduate learning. This is likely to continue into the 1980's.

Liberal versus Useful Education

Debate about the true purposes of education has occupied some of the greatest minds in every generation. In the United States, the most enduring form of that debate has focused on the presumably inherent and irreconcilable differences between a liberal education and professional or vocational training. Although the terms, "useful," "practical," "relevant," and others have often been used in these debates, as Rudolph (1977, p. 13) points out: "It should never be thought that any curricular reform was really ever advocated or any curriculum defended, at least on this side of the Atlantic, being other than practical."

Rudolph goes on to make the case that even the famous Yale Report of 1828, which vigorously defended the classical curriculum, "argued

for the practicality of what others considered impractical." Cheit (1975, p. 134), approaching the subject of liberal education from the vantage point of the professions, notes the history of tensions between the "liberal" and the "useful" and the reasons for the renewed urgency of the debate in the 1970s.

> Now the issue is being posed through enrollment pressure on the liberal arts. Declining demand for new faculty in the academic labor market has, in turn, reduced the number of students for whom a liberal education would be a "vocational" education. But the main enrollment pressure comes from the new vocationalism, the major element in the new condition facing higher education, and predictions of an absolute decline in the numbers of students attending colleges and universities within a decade. This means that the rise in vocationalism is not just absorbing growth but actually shifting students away from the liberal arts.

Indeed, widespread publicity about the college graduate who has no "marketable skills" has had dramatic effects on the educational and career choices of college students in recent years. The Carnegie Council Surveys, 1975-76, found that "95 percent of America's undegraduates considered training and skills for an occupation to be either 'essential' or 'fairly important' goals of their college education (Carnegie Foundation 1977, p. 223). Nationally, undergraduate enrollments were spread as follows: professional schools, 58 percent; social sciences, 8 percent; humanities, 5 percent; sciences, 15 percent; arts, 6 percent and other or no major, 8 percent (Carnegie Foundation 1977, p. 6).

Another factor contributing to the increased vocationalism of college students—one that shows little sign of abating—is the growing cost of higher education. As Bledstein (1977, pp. 144-45) has pointed out: "As higher education becomes more and more expensive, middle-class expectations will focus even more than before on careers, vocations, and results."

The difficulties facing liberal education have been exacerbated by the decline of general education requirements that might reflect an institutional, if not national, consensus about the meaning of being liberally educated. Relaxed general education requirements have also contributed to declining enrollments, most notably in the humanities. This has prompted a new interest in the "curriculum" as a topic of practical as well as philosophical concern. It has also contributed to new effort to restore breadth or distribution requirements, such as those recently instated at the University of California, Berkeley, and new core curriculum approaches to general education, such as those proposed at Harvard.

Resurging interest in curriculum models and philosophies of education can also be seen in the recent work of the Carnegie Foundation. Levine (1978, pp. 250-417) summarizes some of the major curriculum models and Bowen (1977) highlights the known outcomes of higher education. Chickering et al. (1977) also include typologies and case-study examples of various curriculum models. The theories of Phenix (1964) and Perry (1968) have had some influence on curricular designs at the undergraduate level, as have the works of such learning theorists as Skinner, Rogers, Gagne, Bloom, and others. Learning as modeling behavior, learning as transaction, learning by doing, learning through reinforcement, learning as a function of cognitive style, learning as development—variations on these models are increasingly finding their way into curriculum designs as well as into higher education research. These models are enriching the more fundamental questions of curriculum design, such as: Should the curriculum be oriented toward the past, the present, or the future? Should it be based on disciplinary, multidisciplinary, or interdisciplinary modes of inquiry? Should it focus more on intellectual, personal, or career development?

New Attempts to Link Professional and Liberal Education

There are a number of indications of a desire both to redefine "liberal" education as "useful" and to reintroduce a liberal or humanistic component into professional and vocational education. In essence, these are attempts to create new links between practical and liberal education, and to restore at the same time some semblance of coherence and meaning to the idea of being "educated" by forging new curricula that wed the two.

One of the areas of current undergraduate cirriculum most likely to change radically as a result of these efforts to wed the liberal and the vocational element in undergraduate education is the "elective." Ironically, the rationale for the "elective" when it was first introduced in the late 1800s was to make the curriculum more "useful," that is, to allow students to go beyond the classical curriculum and to study such "useful" subjects as modern languages and literature, physics and chemistry, as well as agriculture and engineering. Yet the "elective," which became a substantial part of the curriculum (in some cases, nearly the total cirriculum) in the late 1960s and early 1970s, is likely to shrink rapidly in the coming years to make room for the "useful" as well as the "liberal" components of both graduate and undergraduate curricula. Blackburn et al. (1976) have shown the shift, already in process from 1967 to 1974, of the portion of the undergraduate

curriculum devoted to electives. Whereas there was no change in the percent of students' time spent on the major (33 percent in both 1967 and 1974), there was a considerable decrease in the percent of time spent on general education requirements (43 percent in 1967 and only 34 percent in 1974) and a corresponding increase in the percent of time devoted to electives (24 percent in 1967 and 34 percent in 1974).

It is worth pointing out, however, that the increased percentage of time devoted to "electives" for the most part represents additional courses elected in the major field, thereby contributing further to the overspecialized nature of undergraduate education.

Design and Evaluation: State of the Art

Invisible, Intramural Nature of Design and Evaluation

Most curriculum changes receive little or no attention outside departmental or institutional walls. Unlike curriculum development projects at the elementary and secondary levels, most curriculum development in higher education is local, not national or regional in scope. While much borrowing of curricular ideas takes place within the higher education community, neither dissemination by the developing institutions nor adoption of a total curriculum "package" by borrowing institutions is characteristic at the postsecondary level. The processes by which curricula are designed and implemented are seldom published because faculty members who undertake curriculum design are not interested in the process per se and receive few or no "brownie points" for producing these kinds of publications.

Even if a curriculum is systematically designed, the *visible* end-product is a new or revised curriculum as it appears in a college catalog, a set of course syllabi, and other instructional materials. Documentation of the design and implementation process, including the philosophy and rationale of the new or revised curriculum and the results of evaluations made prior to, during, or following the implementation of the curriculum is typically contained in the fugitive memos and working papers of a curriculum or evaluation committee—if they have been put in writing at all.

Similarly, even if a curriculum is systematically evaluated, the evaluation is rarely available for public or scholarly scrutiny, unless undertaken as a research project or funded by a foundation or government agency. Departmental self-studies frequently include a curriculum component, but the reports are usually considered—as the name implies—*entre-nous*. Curriculum evaluation most often occurs as part of the larger process of intramural or academic program review within the institution, or as a component of an external accreditation.

Obstacles to Systematic Approaches

We have indicated several factors that mitigate against systematic curriculum design and evaluation efforts: the lack of models or guidelines in the published literature; lack of faculty training and expertise in techniques of design and evaluation; and lack of incentives or

motivation to undertake curriculum evaluation and revision given the reward structure of most colleges and universities.

A number of other obstacles or barriers to systematic curriculum design and evaluation have been discussed by Heubner (1976), Chickering et al. (1977), and the Carnegie Foundation (1977). A case study example of the barriers to systematic approaches to the curriculum comes from Task Force A of the national project on Teaching Undergraduate Sociology. This project, one of the few national curriculum development efforts undertaken at the higher education level, is sponsored by the American Sociological Association and funded by the Fund for the Improvement of Postsecondary Education (FIPSE). A recent report on the project's status (Campbell et al. 1977), concludes that very little is known about curriculum design, in part because sociologists have not turned their attention inward on themselves to study the organization of their discipline as "curriculum." The authors identify three factors that work against comprehensive curriculum design and evaluation efforts.

First, the utilitarian character of most sociology departments, combined with concerns about infringements on academic freedom, means that faculty members exercise almost exclusive control over what they teach in their own courses. In reality, this means that the curriculum is merely the sum of the individual courses offered at any given time.

Second, differences in the perceived mission of the department or discipline result in unclear guidelines for curriculum change. Should the curriculum be organized to train students in the methods of inquiry of a discipline, or should it reflect a more liberal orientation, emphasizing an understanding of the major social issues faced by societies? Issues of this kind are further exacerbated by sharply different views of the desirable direction and mission of the discipline itself.

Third, the Teaching Sociology Project found that the confused state of learning theory contributes to the lack of systematic curriculum design. No single theory commands universal support. Behaviorist, humanistic, transactional, and developmental theories all suggest different curricular structures and instructional strategies.

External and Internal Pressures and Opportunities

Recently, various internal and external pressures for more rigorous and systematic approaches to curriculum evaluation and change have begun to affect college and university practices.

Examples of external pressures include: high rates of unemploy-

ment and underemployment of college graduates in many fields; changes in the curriculum of high schools; increasing demands from legislatures, postsecondary education commissions, and the public for accountability, cost-effectiveness, and increased productivity in higher education; increased questioning of the "value" of education as an investment; and increasing demands that higher education solve a vast array of social and technological problems through the development of new curricula.

In our examination of case studies of curriculum evaluation and development, we found faculty considering curriculum change in response to many of these external pressures. For example, Rhode Island College developed a Masters of Social Work program as a result of feasibility studies and recommendations made by a special legislative commission to study social services in the state. The University of Virginia, faced with the national decline in teaching positions in English, created a new Ph.D. program to "close the gap between traditional programs of literary study and the career needs of graduate students who will eventually identify themselves as teachers rather than researchers." The Environmental Studies program at the University of California, Santa Barbara, was developed in direct response to "increasing environmental concerns from the community and university and the demands for relevance from students."

Internal pressures from within the institution can also indicate the need for more systematic approaches to curriculum design and evaluation. These pressures include: shifting or dwindling enrollment patterns in various departments; changes in the nature and composition of the student body; faculty turnover and shifting faculty interests in new areas of knowledge; student desires for autonomy in creating and selecting courses; declining student achievement levels in basic skills, such as writing and mathematics; and steady-state or reduced budgets that have forced many institutions to cut back expenses and set priorities among curricular offerings.

Frequently the impetus for change comes from a combination of factors. For example, increased demand for education in veterinary medicine, growing specialization in the field, and the changing interests and skills of students contributed to a major curriculum revision at the University of Minnesota's School of Veterinary Medicine.

Opportunities for curriculum and revision have been expanded by grant programs sponsored by foundations and governmental agencies and by intramural grant programs at many colleges and universities. In addition, the need to make formal proposals for intramural or

extramural funding, coupled with requirements that such grant proposals include appropriate evaluation plans and culminate in detailed reports, promises to make major curriculum development projects both more systematic and more visible than they have been in the past.

Concepts and Linkages

Defining Curriculum

Although nominally designed to set appropriate boundaries for structured inquiry, definitions of curriculum have in fact become notoriously ambiguous topics of freewheeling debate. Widespread lack of agreement about definitions of curriculum reflects the scope and complexity of the curriculum itself. As we have pointed out, a single curriculum of higher education no longer exists. Similarly, curriculum as a concept is neither unitary nor static.

There are at least three ways that curriculum has been defined in the theoretical literature. They range in conceptualization from the very narrow to the very broad (Beauchamp 1977, p. 22).

First, curriculum can be described as *the selection of courses of study or content*, i.e., what is or ought to be taught. In this definition, a curriculum either describes or prescribes the content and goals of formal instruction but does not consider the means of instruction to be used.

A second definition combines content with instructional methods so that means and ends are considered simultaneously. The third, and broadest definition of curriculum subsumes content, instruction, the learner, and the evaluation of learning.

At the higher education level, what is usually meant by the curriculum is "all the courses offered, considered as a totality," or, "all the courses taken by some person one after another" (Chickering et al. 1977, p. xiv).

The most difficult questions from the point of view of curriculum design and evaluation are those posed by the definition of a curriculum as *the totality of courses taken by an individual or group of individuals*, especially when it leads to the awarding of a certificate or degree. At this level, questions regarding the adequacy of the breadth and depth of course work and its organization, coherence, and sequencing become paramount if a degree is to have any real meaning.

In defining curriculum for this monograph, we have incorporated many of the ideas of other authors (e.g., Dressel 1976; Chickering et al. 1977; Levine 1978). Ours too is an operational definition, adopted for purposes of clarifying the scope of our inquiry, rather

than entering the debate about the proper limits of curriculum theory and methodology. We define curriculum as *the totality of courses that constitute a course of study offered by an institution or followed by a student.*

Following our definition, the examples of curriculum design and evaluation that we have included in our inquiry range from a one-year curriculum of prescribed studies (such as a freshman or first-year graduate core curriculum) to a multi-year course of studies leading to an undergraduate, graduate, or professional degree in a given subject field.

Linkages Between Design and Evaluation

In our view, the processes of curriculum design and evaluation are inextricably linked. The questions that face the curriculum designer and the curriculum evaluator are so conceptually interrelated (indeed, in some cases identical) that it is impossible to address one set of questions without the other. For example, posing the question, "Do we need a new or revised curriculum?" simultaneously raises evaluation questions, e.g., "What evidence do we have that a new curriculum is needed?"; design questions, e.g., "What curriculum options are possible?"; and questions that combine evaluation and design, e.g., "What should the new curriculum try to achieve that the present curriculum does not?"

This "dialectical process," as Halliburton (1977, p. 70) refers to it, continues throughout all phases of curriculum development. In exploring a design question about curriculum options, for example, further evaluation questions are likely to be raised. These might include: What evidence exists about the effectiveness of various curriculum options we wish to explore? What have been the experiences of other departments or institutions that have introduced those options? Similarly, suppose one begins with an evaluation question, "How well is our curriculum meeting the needs of our students?" This question, in turn, implies a host of design questions, such as: Whose needs should be served by our curriculum? What kinds of students should we be educating and for what purpose?

Curriculum design and evaluation are interdependent activities that should be considered as a whole. Evaluation is not something to be superimposed or tagged onto a curriculum development project; it involves a form of critical thinking and informed decision making that lies at the very heart of the design process. This view stands in con-

trast to the more prevalent linear models of curriculum design and evaluation.

In the linear model, evaluation is typically presented as the last step in a series, which begins with the formulation of goals and objectives, and proceeds through design and implementation stages to rest finally with questions of evaluation. The loop or feedback model, which is usually advanced as an improvement over the linear model, in fact does little more than suggest (usually with a graphic representation) that information obtained during the evaluation stage should be fed back into the cycle to make improvements. It still treats evaluation as a process conceptually separate from design, a view that leads all too many curriculum designers to the conclusion that although evaluation may be useful, it might be dispensed with in the interest of economy or efficiency.

Others, such as Kliebard (1977) and Hall (1975) have criticized the linear model not only because it relegates evaluation to the end of the project, but because it misrepresents the order in which other aspects of the design process occur. The model assumes that goals and objectives can be defined at the beginning of the design process, when, in fact, there are many outcomes that arise out of the instructional process itself, and only become defined as goals after the curriculum is implemented. In many cases, the best place to start may be with an analysis of the learning experiences and outcomes of the existing curriculum, rather than a statement of the goals and objectives for the new curriculum.

In fact, questions of curriculum design and evaluation can be addressed in almost any sequence and frequently will receive simultaneous consideration. The sequence chosen will depend in large measure on the nature of the curriculum, the purposes of the evaluation, and the interests, needs, and intellectual proclivities of the curriculum developers and evaluators.

Evaluation as Needs Assessment

One of the key links between curriculum design and curriculum evaluation begins with the question: Do we need a new or revised curriculum? The answer is seldom a simple "yes" or "no," and there is bound to be uncertainty and dissent when the question first arises. Indeed, the question is unlikely to be raised at all unless considerable dissatisfaction with some aspects of the current curriculum has been expressed by some individuals or groups.

The nature of the dissatisfaction is often initially vague, yet widely shared by faculty members, administrators, and/or students. One example is the concern that current undergraduate curricula are too "narrow" or "specialized" for the complex and changing demands placed on an educated citizenry. Another is the widespread discontent with liberal arts cirricula because they do not provide students with sufficiently "marketable" skills. Other dissatisfactions may be more limited and specific, such as the dissatisfaction of some faculty members with the need to provide "remedial" courses within their departments or colleges, or the criticism of students that certain required courses, such as foreign languages, are "irrelevant."

Most curriculum changes in higher education are made solely in response to these kinds of dissatisfactions or to the demands of a particularly vocal or influential minority of faculty members, students, or segments of society. Less frequently, as we have noted, decisions to create or revise curricula are informed by systematically gathered evidence of need.

The value of systematically gathered information for making decisions about the need for new or revised curricula is most apparent in cases where many individuals and groups must be convinced of that need if their cooperation in designing and implementing curricular changes is to be secured. When the number of decisionmakers is small and their personal knowledge about the effectiveness of a curriculum already great, additional information or data may not be necessary to make decisions. Certainly evaluations should not be undertaken that are unlikely to produce information that will be helpful in making decisions.

Decisions about general education requirements for an entire college, however, or decisions to substantially revise an undergraduate or

graduate major obviously require the cooperation and consensus of large numbers of faculty members. One reason why such decisions take many years to reach and even longer to implement is the absence of any tangible and convincing evidence that any change is really needed. In such instances, discussion and debate tend to be heavily sprinkled with personal anecdotes, as well as obscured by disciplinary or political and philosophical differences having little or nothing to do with the curriculum issues at hand. While information and data cannot resolve all philosophical and value differences, of course, they can help to focus decisionmaking, increase consensus about the need for a new curriculum, and smooth the path toward curriculum implementation. This is especially true when the decisionmakers and other participating faculty members are themselves involved in the evaluation process. It is much more difficult to dismiss problems of student enrollments, student attrition, or deficiencies in student learning when there are hard data on the table, not just rumors or individual impressions.

Sources and Kinds of Evidence

How can we determine whether we need a new or revised curriculum? What sources and kinds of evidence can help us decide what kind of new or revised curriculum is needed?

There are two basic approaches to identifying curriculum needs. The first involves evaluating an existing curriculum to identify its strengths and weaknesses. The curriculum may be the one we wish to revise or a curriculum that we would regard, in some sense, a "competitor" to the new curriculum we wish to develop. This approach helps to assure that the best aspects or components of a curriculum are not discarded along with those judged to be deficient or no longer desirable.

The second approach, most frequently used in deciding whether to develop a new curriculum, is often referred to as needs assessment. Information gathered through needs-assessment techniques can help avoid costly duplication of programs, estimate the likely level of faculty support for (and opposition to) the new curriculum, more accurately project student enrollments, and ensure the acceptance of our graduates by employers or graduate and professional schools.

Within each of these two approaches, the evaluation of existing curricula and the assessment of need for new curricula, there are a variety of specific techniques that can be used to gather information on which to make decisions. While all of these techniques require

some investment of time and resources, their use as important planning tools can often save even more time and resources (as well as political and psychic wear and tear) during the curriculum design and implementation stages. Most of the assessment and evaluation procedures can be undertaken by a curriculum planning or self-study committee of faculty members and students, provided that the group includes or consults faculty or staff members who are experts in social science research methods or have some training or experience in evaluation.

Evaluating Existing Curricula

Analysis of student transcripts—As a recent Carnegie Foundation report (1977, p. 97) points out, "the 'real' curricula are not found in college catalogs." Rather, "they take shape in the students' transcripts, where, from the hundreds of courses listed . . . the 32 to 40 that make up a student's four-year program are recorded." In recent years, studies of student transcripts have been undertaken at the Universities of California, Berkeley (class of 1975), Minnesota (class of 1973), and Pennsylvania (class of 1976). The results of such studies can be useful both in deciding whether curriculum reforms are desirable and in marshalling support for curricular changes.

At Berkeley, the results were used as part of the justification for reinstating breadth requirements. Part of that evidence confirmed a suspicion that without breadth requirements, Berkeley undergraduates were receiving a very narrow education.

The University of Minnesota study, undertaken at the request of the Council on Liberal Education, was designed to answer the question: What courses are most frequently used to fulfill the four distribution requirements? The results indicate the extent to which the practice, if not the idea, of a core, general education curriculum has been eroded, even at an institution that had not given up its distribution requirements in the early 1970s. Seniors graduating from the University of Minnesota in 1973 took a total of 308 different courses in 34 different departments to meet the requirement in Communication, Language, and Symbolic Systems; 261 different courses in 21 departments to fulfill requirements in Physical and Biological Sciences; 333 different courses in 22 departments to fulfill requirements in Man and Society; and 564 different courses in 33 departments to fulfill the requirement in Artistic Expression.

The analysis of transcripts has also been used at Minnesota to compare the curriculum patterns and experiences of seniors graduating

from the College of Liberal Arts and an experimental degree program, the Bachelor of Elected Studies. The methodology and findings are reported in Hendel and Robirson (1976).

Yet another use of transcripts to study the curricular paths and options of students was undertaken by Educational Testing Service. Analyzing the transcripts of a sample of students majoring in nine disciplines at several colleges and universities, Warren (1975, p. 14) found that a "major" constituted one of three or four different patterns of concentration. For example, an undergraduate major in history for one student might consist almost entirely of Latin American history; for another, Asian history; and yet for a third, American history. While such specialization is common and probably necessary at the graduate level, these findings emphasize the fact that a student with a bachelor's degree in any given discipline may actually have studied only a narrow range of that field's subject matter as popularly conceived.

Patterson (1978) describes a computerized system for monitoring the curriculum that is in use at State University of New York, Buffalo, and is adaptable to other colleges and universities. Called the Curriculum Interaction Model (CIM), the program analyzes the courses students take to satisfy various requirements and monitors enrollment trends. It provides information on the percentage of a department's courses that are taken by majors and by students in any number of other majors. It also indicates, for each major, the departments in which students are taking courses outside the major. Detailed charts, figures, and tables can be generated to provide a more complete picture of student course patterns.

Comprehensive examinations—Although transcripts can provide valuable information about what courses of study students are following, they cannot reveal what students have actually learned from a particular pattern or sequence of courses. The comprehensive examination is one of the oldest types of tests in American higher education. Harvard had both entrance and graduation tests in 1646 (Levine, 1978, p. 77), and from the seventeenth century through the 1960s comprehensives were quite common. There has been a considerable decline in their use since the late 1960s, however. Whereas between 33 and 40 percent of four-year arts and sciences colleges employed comprehensives during the 1950s and early 1960s, by 1975 only 24 percent of these institutions featured these kinds of examinations (Levine 1978, p. 89).

Some institutions that continue to use comprehensives include: St. John's College; the University of Minnesota's General College; Uni-

versity of California, Santa Cruz; Reed College; and Simon's Rock College. Hampshire College requires two comprehensives in the major as well as four comprehensives in general education (Levine 1978, p. 90).

Three strengths of a comprehensive examination as viewed by the Carnegie group include: forcing "students to integrate and synthesize knowledge from more than one course, which the typical undergraduate program does not call upon them to do"; building "a period of review and introspection into a college education"; and providing "students with an otherwise absent general assessment of their performance by faculty" (Levine 1978, p. 90).

Most frequently, sophomore or junior comprehensives have been used to diagnose individual student deficiencies and prescribe remedies, whereas senior comprehensives have been used as graduation or honors rquirements (Dressel 1976, p. 245). Some institutions, however, have used group scores on these tests as one measure of the effectiveness of the curriculum. Dressel (p. 247) has pointed out that:

> Colleges that use objective examination programs, such as the Undergraduate Program Area Tests, frequently feel that the results are most helpful in the evaluation of the curricular and instructional program. For this purpose, norms which provide comparability from institution to institution and, to some extent, even from department to department within an institution are considered valuable. Colleges have required additional course work in certain areas or introduced new courses because seniors have demonstrated weaknesses in certain phases of comprehensive examinations.

Some standardized tests that have been used as comprehensive examinations include the Graduate Record Examination, the Undergraduate Program Area Tests, and the Sequential Tests of Educational Progress. Information on these and other tests can be found in Buros (1972). Tests designed to measure achievement in a single subject matter field have also been developed. One example is TUCE, or the Test of Understanding College Economics. Discipline-specific tests also can be found in Buros (1972).

Two reasons for the declining use of comprehensive examinations have been the poor quality of the examinations developed by many institutions or departments and the poor match between the goals and curricular content of a given institution and the knowledge and skills measured by standardized examinations. Dressel (1976, pp. 252-255) has discussed several characteristics of a successful comprehensive examination, including: (1) clarity of purpose, of use, and of the educational objectives to be attained; (2) effective coordination and avail-

ability of technical assistance in designing and handling the examinations; and (3) a close relationship among curricula, instruction, and the examination.

Tests of academic competences--In the 1970s, considerable interest in the use of tests to evaluate curricula has been generated. Test development projects have been funded most notably by the Fund for the Improvement of Postsecondary Education. One such project is the Educational Testing Service's study of Academic Competences in General Education, directed by Jonathan Warren, which is designed to measure four academic competences: *communication skills, analytic thinking, synthesizing ability,* and *awareness.*

Unlike most tests, the Academic Competences test is not designed to measure the competences of individual students; hence, it does not yield individual scores. Rather, the purpose of the test is to allow institutions to get some idea of how well their students are acquiring these basic competences over a two or four-year period, by administering versions of the test on a pre- and post-test basis. Another promising use for the test is to compare student academic growth in two or more undergraduate programs within the same institution. Eventually, it is expected that norms will be available so that institutions can also compare their students with those at other colleges or universities. Because the test is still in the developmental stages, it is not yet ready for use in making either summative or comparative judgments about the success of one or more programs of study. However, as a formative evaluation tool, the Academic Competences test appears promising and is expected to be available through ETS for experimental use in 1979.

Similar tests of academic competences are also being developed by the American College Testing Program (Forrest and Steele 1977), and by a group of researchers associated with the Institute for Competence Assessment in Boston. The ACT tests, called the College Outcome Measures Project, focus on such core abilities as *communication skills, problem-solving, critical thinking,* and *values analysis.* These tests require short, written answers, longer essays, or oral responses to a range of questions. Currently in its second year of development, the tests ultimately should be useful for planning and evaluating liberal education programs, awarding college credit for knowledge and skill through nonacademic experiences, certifying student achievement, or screening candidates for graduate or professional training. Work is underway to develop a multiple-choice version of these tests. The Institute for Competence Assessment has developed tests of concept

formation and analysis of arguments that can be used as measures of higher education outcomes.

A number of higher education associations are also showing considerable interest in the idea of measuring academic competences. For example, the American Council on Education has recommended three of the four ETS competences as ones the bachelor's degree should be concerned with, and they have added a new, fourth competency, "quantitative skills," to the list. The American Association of State Colleges and Universities organized a meeting in August 1978, to examine ways of assessing the four competences ACE has recommended.

In a slightly different vein, the College Board has established a five-state Career Education Consortium to "(1) identify those skills most central to successful career development and (2) to provide the means for assessing study competency in these areas" (*Education Recaps*, Vol. 17, No. 7, March 1978, p. 14). The resulting Career Skills Assessment Program, to be available for use in the 1978-79 academic year, is designed to measure six career skills: *self-evaluation and development, career awareness, career decisionmaking, employment-seeking, work effectiveness,* and *personal economics.*

Competency-based education—Tests of academic competences are probably most familiar to the reader in connection with the widely publicized competency-based education, or CBE movement, in which entire colleges (e.g., Alverno, Sterling, Mars Hill) or entire professional schools (e.g., Antioch School of Law, Case Western Reserve University's Ph.D. Program in Organizational Behavior) or departmental majors (e.g., Astronomy at Rice University), have adopted a competency-based approach to curriculum design and to student evaluation.

In competency-based education, the number of competences or skills set forth by an institution is typically greater than the three or four included in national test development projects. Frequently, too, broad competences—such as communication skills—are broken down into a large number of behavioral objectives that are used in both the design of courses and the assessment of students.

The broad competency statements of CBE colleges sound much like the goal statements one finds in most small liberal arts college catalogs. Agreeing that students should "achieve understanding of the relationship of the individual and the environment" (Alverno College) may be relatively easy; more difficult is reaching consensus about the specific kinds of knowledge, attitudes, or skills that constitute this competency; the learning experiences most likely to achieve it; and ways of

assessing the extent to which competences have actually been achieved. Most colleges that have developed a CBE curriculum have required fairly large extramural grants to design and implement their new curricula.

The chief purpose of CBE has been stated by Trivett (1975, p. 3): "Competency programs in higher education combine rationales, approaches, and strategies in a common notion: a degree or certificate from a collegiate institution should mean that the recipient has achieved certain competencies." The Trivett monograph covers most of the issues involved in competency-based education.

Examples of student work—Typically, examples of student work are used to evaluate students, not curricula. Yet examples of student writing provide an excellent database for evaluation, especially in the humanities, where essays and term papers play an important role in the curriculum. Evaluation of student work can be used both to assess the need for a revised curriculum (e.g., to see if student writing skills need to be improved) and for evaluating the effectiveness of a new or revised curriculum.

A variety of methods for measuring student growth in writing skills are described in Diederich (1974) and Cooper and Odell (1977). Based on these references, faculty members at the University of California, San Diego developed their own scoring procedures for use in the Fourth College Writing Program. The use of such methods need not be limited to English departments, however. They can be used in advanced foreign language courses and in any course where students are required to write extensively. Some of the basic techniques can be modified, replacing criteria of good writing with criteria for analyzing logical arguments in philosophy or rhetoric or developing a brief in law.

Institutional self-study instruments—A number of institutional self-study instruments have been used by colleges and universities. These include: the College Characteristics Analysis (CCA); the College and University Environment Scales (CUES); the College Characteristics Index (CCI); the Institutional Functioning Inventory (IFI); and the Institutional Self-Study Survey (ISS), among others. These instruments, along with many others, are described in Hodgkinson, Hurst, and Levine (1975). Although institutions might find this kind of survey information useful in terms of long-range planning or as background material for a curriculum design and evaluation project, most of these instruments include only a few items directly pertaining to the curriculum.

One exception is the Institutional Goals Inventory (IGI) developed by ETS in 1970. The IGI includes a large number of goal statements relating to the curriculum, as well as goals pertaining to the overall climate of the institution and its contributions to the production of new knowledge and the needs of the community. The IGI goal statements are designed to elicit both "is" and "should be" responses from students, faculty members, trustees, and key community groups. Uses of the IGI include: formulation of institutional policy; general decision guide for allocating resources; short- and long-term planning; institutional evaluation; and accountability (Peterson 1971, pp. 5-9).

Surveys of current and former students and faculty—Perhaps the most frequently used method of gathering information about an existing curriculum is a specially designed survey of current students. The survey most useful to a curriculum committee focuses on graduating seniors or students who have recently completed a lower-division or graduate-level curriculum.

Senior surveys have a number of advantages. For example, seniors are better able to judge the value of their education toward the end of their studies than they are able to do earlier. Student surveys are relatively easy and inexpensive to conduct, and can often be designed to evaluate multiple aspects of the curriculum, e.g. course, instructors, and advising at the same time. Student interviews, such as those conducted at Radcliffe and Harvard (Perry 1968) also provide valuable information. The Perry model is being used extensively at SUNY, Stony Brook, to evaluate new undergraduate curricula.

Surveys of alumni obviously have the advantage of even greater distance and perspective on a curriculum and of its adequacy for subsequent personal and job-related activities. The most difficult aspect of conducting surveys of alumni is acquiring and maintaining current addresses for former students. In most cases a permanent address of a parent or relative who can be counted on to forward mail is needed. In some institutions, alumni associations have been helpful in providing addresses to departments wishing to contact former students. In addition, former students—especially those who are graduates of professional, vocational, or graduate level programs—can be located through their place of employment if the school or department keeps fairly good records of the job placements of its graduates.

Alumni surveys have been used in veterinary medicine at the University of Minnesota, wildlife science at Utah State, and architecture and social welfare at the University of California, Berkeley. These surveys focus on postgraduate satisfaction with various aspects of the

curriculum change. On a broader scale, the Pennsylvania State Department of Education systematically surveys recent recipients of baccalaureate degrees in the state to determine their postgraduate activities and employment status.

In addition to surveying current students and alumni, other important groups of students who should be considered are dropouts, students who transfer out of one major into another, and students who are admitted to a program but decline to matriculate. Studies of student attrition are especially important in cases where attrition is known to be considerable or enrollments have sharply declined. Knowing why certain kinds of students have declined to matriculate or have left a course of study can be helpful not only in deciding whether a revised curriculum is needed, but in determining what the new curriculum should be. For example, an institutional self-study at SUNY, Stony Brook, focused on the fact that in recent years two out of three students accepted at Stony Brook declined to matriculate.

At the University of California, Santa Barbara, the mathematics faculty was concerned about the substantial decline in upper-division math courses during a period in which dramatic increases in lower-division math courses had occurred. They concluded that students who might have become math majors were either selecting other fields or were leaving the Santa Barbara campus. Survey data were gathered from former majors who had switched to other fields, and this information was used in redesigning the mathematics curriculum.

In addition to surveying students, many departments find it useful to survey their faculty as well. At Utah State University, faculty members, current students, and alumni in civil and environmental engineering and in wildlife science and range management were asked to rate their respective curricula on a number of dimensions. In each department, faculty members tended to be more critical of the department's performance than were either current students or alumni. Adding faculty perspectives to those of students and alumni can considerably enrich the data-base for curriculum reform.

Academic program reviews—Although there have been exceptions, in the past most program and accreditation reviews have not been either very rigorous or very systematic. Unless the department or college has engaged in on-going curriculum evaluation or has undertaken a self-study in preparation for the review, the review committee is faced with the task of gathering whatever information it can and seldom has the time or resources to conduct surveys, analyze transcripts, or undertake other systematic curriculum evaluation projects.

In recent years, however, a number of universities have developed more systematic guidelines for academic program reviews. These include the Universities of California—Berkeley; Nebraska—Lincoln; Illinois—Urbana-Champaign; and Western Michigan University. Although program reviews, like institutional self-studies and accreditation reviews, cover a great many areas of academic functioning, they do devote some effort to evaluating the curriculum.

At the University of Illinois, Urbana-Champaign campus, the review includes a detailed departmental self-study. As part of the self-study procedure, faculty members are requested to complete questionnaires about their professional accomplishments and departmental status; descriptive information is gathered about course loads, instructional costs, and enrollments; and students are asked to complete the Program Evaluation Survey (PES), a campus-wide questionnaire that asks for student opinions on the quality of instruction and advising, the variety of courses offered, and other aspects of the curriculum and departmental functioning. The use of a single questionnaire, the PES, across all departments allows comparisons to be made between similar curricula as well as between an old and a new version of the same curriculum at two different time periods.

Assessing the Need for a New Curriculum

The second approach to gathering information about the need for a new or revised curriculum is frequently referred to generically as "needs assessment." We have arbitrarily separated a discussion of needs assessment from that of evaluating an existing curriculum, because, as Stufflebeam (1977, p. 8) has pointed out, "needs assessment studies most often are employed for planning, diagnosis and public relations purposes, and almost never to assist in assessing the merit of observed outcomes."

It is important to note that "needs assessment is not a single technique. Indeed, many of the techniques we have just discussed, e.g., analysis of transcripts, comprehensive examinations, student surveys and institutional self-studies, can be considered as important measures of "need" in deciding whether a curriculum should be revised.

In addition to information that reveals the strengths and weaknesses of existing curricula, it is often necessary (or at least highly desirable) to obtain other kinds of information about the "need" or potential market for a proposed curriculum. This kind of information is difficult to interpret, however, because there are important differences between "needs" and "wants," on the one hand, and "needs" and "de-

mand" on the other. There is almost always a constituency to be found in support of a new curriculum, be it in water conservation, general studies, Hindi-Urdu, or parapsychology. That is not to say that there is *necessarily* a societal "demand" for such programs or an institutional "need" to provide them. Nor is it necessarily the case that there will be sufficient "demand" in terms of enrollments or in terms of jobs for the graduates of such programs (Wood and Wilson 1976). Needs assessment studies, if they are to be helpful in making rational and cost-effective decisions, should go beyond surveying student wants or desires, and include an examination of programs that might be competitors and an analysis of the potential job market for graduates of the proposed new curriculum.

Increasingly, more systematic needs assessment studies are being requested by state postsecondary commissions in recommending or approving new curricula proposed by public colleges and universities. For example, the Delaware Postsecondary Commission conducted a *Survey of Gerontological Offerings, Programs, and Activities* in 1976, in order to assess the "wisdom of establishing a training consortium in the field of gerontology." Similarly, with the aid of a grant from the Lilly Foundation, the Indiana College-Level Manpower Study has produced studies of the demand for legal assistants, and the Louisiana Board of Regents has conducted studies of the supply and demand for lawyers and the feasibility of establishing a regional school of optometry. In California, the Postsecondary Education Commission undertook a study to determine whether education in veterinary medicine should be expanded. Indicators the Commission chose to examine included: student demand for veterinary education, statewide and regional need for additional veterinarians, and the need for certain specialists.

Before developing a new Masters of Social Welfare program, the University of Rhode Island examined human service needs in the state, perceptions of human service workers, projections of human service needs of the American worker, and alternative models for social welfare programs. At California State University, San Francisco, faculty members contemplating a new undergraduate program in Labor Studies contacted community college students in a labor studies program to gauge their interest in a four-year degree program. They also examined the curricula of other labor studies progams and surveyed union members and leaders to determine demand for the program.

Needs assessment studies of this kind are becoming more important

in making decisions between new and existing curricula in the allocation of scarce resources in the 1970s and are likely to continue into the 1980s. An elaborate "Checklist for Designing Needs Assessment Studies" has been developed by Stufflebeam (1977).

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Curriculum Design

Once it has been determined that a new or revised curriculum is desirable, there are a number of ways of approaching the question, What should the new curriculum look like? If the decision to develop a new curriculum was prompted by deficiencies in the existing curriculum, information about those deficiencies will no doubt play an important role in the design. Similarly, if data on the needs of students or employers have been gathered, that information may suggest new directions or components for the curriculum. Regardless of whether the decision to design a new curriculum has been preceded by formal evaluation or needs assessment activities, there still remains the task of defining the purposes, content, and structure of the new curriculum. Several ways of approaching that task are discussed in this section: exploring curriculum options; researching curriculum goals; agreeing on curriculum goals; and defining the "ideal" curriculum.

Some approaches will no doubt appear more compelling than others. Even if all four approaches are followed, they need not be done in the order in which they appear here. For example, a curriculum committee that is certain to be divided on goals and objectives, or convinced that goal setting is a naive or useless task, might find discussions of the "'ideal" curriculum or an exploration of curricular options a better way to begin the design process.

Exploring Curriculum Options

If a faculty committee agrees that a new curriculum is needed, but is divided or unsure as to what the new curriculum should look like, exploring curriculum options might be a good way to begin. Although many writers have deplored the increasing homogeneity of college curricula, in fact, looking to see what other institutions have done is not only the most common, but perhaps the most common-sense approach to curriculum design. Exploring the literature for typologies and models of curricula can also help to stimulate the design process.

The educational preparation of college teachers is devoted almost exclusively to the content and methods of inquiry of a discipline. Graduate education rarely includes knowledge of the goals, curriculum models, or history of undergraduate education. Nor does it provide instruction in curriculum of course design, learning theory or

methods of instruction, purposes and ways of assessing student performance, or methods and tools of curriculum or course evaluation. A curriculum development committee can function as a faculty development committee as well. In the process of making decisions about a curriculum, a committee can educate itself about options in curricular structures, purposes, and formats.

Ideas about possible curriculum designs can be explored from many sources. The following list, which is adapted and expanded from one use in the design of a music education curriculum at Syracuse University by Eickmann and Lee (1976), may be a helpful guide for exploring curricular options. A larger curriculum committee could divide up the task with one or two members taking responsibility for assembling, analyzing, and summarizing good ideas from each of the sources thought to be potentially useful to the group.

(1) Analyze current textbooks in the subject field(s) to identify major concepts and ways of organizing knowledge.

(2) Go through several years of major journals for articles devoted to teaching in the discipline and identify promising new curricular approaches. Increasingly, disciplines are generating entire journals devoted to problems of teaching. Journals in related fields can also be a source of good ideas, e.g., *Teaching Political Science, Teaching Sociology, and Teaching of Psychology* contain articles of potential interest to any of the social sciences or professional schools that have a social science component. Most of these journals are indexed in the ERIC monthly bibliographies journal *Current Index to Journals in Education.*

(3) Obtain back issues of newsletters relating to teaching improvement. *Memos to the Faculty* produced by the Center for Research on Teaching and Learning at the University of Michigan is one of the oldest and the best of the newsletters.

(4) Analyze research in the field as reported in the major scholarly and disciplinary journals to identify recent developments and contemporary ideas.

(5) Review research related to teaching in the discipline, as reported in *Dissertation Abstracts.*

(6) Contact persons knowledgeable about curriculum design in the area.

(7) Analyze guidelines suggested by accreditation agencies or professional licensing bureaus, where appropriate.

(8) Survey and study similar programs at other colleges and universities.

(9) Contact relevant disciplinary associations to see if they have produced curricular guidelines or materials.

(10) Interview potential employers, career placement counselors, and examine the requirements of relevant graduate and professional schools.

(11) Talk with practicing members of the profession or those whose work makes use of the discipline to see what competences are most needed and most used.

(12) Analyze and synthesize data from faculty and student surveys, or other information gathered as part of a needs assessment or evaluation of the existing curriculum.

(13) Locate reports or abstracts from private and government foundations for similar curriculum projects. *The Chronicle of Higher Education*, the annual reports of foundations, *HEW News*, and many other newsletters and foundation directories can provide leads. If your institution has a development office, an office of contracts and grants, or a teaching improvement office, their staff members can often provide assistance. Librarians, too, can be helpful in providing you with information about foundations.

(14) Review models or typologies proposed by leading curriculum theorists, learning theorists, or philosophers and students of higher education. This last resource can be especially fruitful for those involved in designing or revising general education and liberal arts curricula at the undergraduate level.

Researching Curriculum Goals

Faculty committees, struggling to set goals for a new or revised curriculum, frequently complain that the process is time-consuming, counter-productive, and unrewarding intellectually. Yet answers to questions about what one expects to accomplish with a new curriculum are important for several reasons. Specifying curriculum goals ensures that the design provides students with sufficient opportunities to acquire the necessary and desirable knowledge and skills associated with a field. A clear statement of goals and objectives[2] also provides

[2] We employ the distinctions between "goals" and "objectives" outlined by the *Encyclopedia of Education Evaluation* (Anderson, Ball, and Murphy 1976, p. 179): *goals* are ultimate outcomes phrased in general or global terms; *objectives* are narrower and of shorter range than goals, typically referring to statements of student behaviors; *behavioral objectives* specify in measurable terms the level of performance expected of a student (e.g., English translation of a 300-word selection from a short story by a nineteenth century French writer with no fewer than two errors), and the conditions under which the performance is to occur (e.g., in the classroom, without a dictionary, within one hour).

the designer with an overall conceptual framework for identifying important gaps and inefficient overlaps in content. Stating goals and objectives for the curriculum lets students know what to expect, so that they can make more informed curriculum decisions of their own.

Despite these apparent virtues, many faculty members feel that setting goals and objectives is of questionable value; they believe such activities inhibit creativity and debase education by reducing it to a set of measurable facts and low-level cognitive skills. It is not essential to establish measurable objectives to incorporate goal-setting in a successful curriculum design effort. Obsessive concern with measurable objectives can overwhelm the most committed and diligent of faculty committees and become a substitute for curriculum design.

Discussions of curricular goals and objectives inevitably involve disagreements about underlying educational philosophies. The curriculum is indeed, "the battlefield at the heart of the institution," as Hefferlin (1969, p. xx) has said. Few issues are battled as ferociously as the curriculum. In general, most goal-setting sessions fail not because discussion of requisite student knowledge and skills becomes intellectually tepid and stale, but because the participants are not able to resolve sharp differences in philosophies about the purposes of education and the directions of disciplinary fields.

Despite the known pitfalls, it is important for a faculty curriculum committee to wrestle with questions of goals and objectives at some point in their curriculum planning deliberations. It need not—and often should not—be the first step. Furthermore, when the time does come to establish goals and objectives, the process can be made a good deal more amiable and productive if certain resources are consulted or goal-setting techniques are employed.

Books on setting goals and writing objectives--The debate about the importance of objectives, what form they should take, and how specific they should be, has generated a substantial technical literature on procedures for developing and writing objectives. Robert Mager has written two short books in a lively, informal style that guide one through the process: *Goal Analysis* (1972) and *Preparing Instructional Objectives* (1962). Both books stress "how-to-do-it" and employ a programmed learning approach. Arthur Cohen, in *Objectives for College Courses* (1970), follows a similar programmed format, but deals specifically with goals and objectives for postsecondary education. These books offer a good elementary introduction to the techniques of writing educational objectives, but do not provide much guidance for deciding what objectives to include.

Taxonomies of educational objectives—At a higher conceptual level, but still not specific to the content of any particular field of study, taxonomies have been developed that describe and classify educational objectives into three major domains: *cognitive* (Bloom et al. 1956); *affective* (Krathwohl, Bloom, and Masia 1964); and *psychomotor* (Harrow 1972). These taxonomies represent sets of goals per se, as well as conceptual frameworks for establishing the specific goals and objectives of a given curriculum. Each domain is divided into several broad educational objectives that are hypothesized to be hierarchical in nature: that is, the least complex behavior occurs at the lowest level, and its achievement is presumed to be necessary for successful achievement at the next highest level in the domain. The major educational objectives of the cognitive domain include: *Knowledge, Comprehension, Application, Analysis, Synthesis,* and *Evaluation.*

Familiarity with the taxonomies early in a curriculum development project can be helpful in alerting faculty to a wide range of possible cognitive, affective, and (in a more limited set of circumstances) psychomotor goals and objectives. As the new curriculum evolves, the taxonomies can also serve as useful references for checking to see that adequate emphasis is being given to all of the objectives that were agreed to, and for developing quizzes, examinations, and other procedures for assessing how well students are achieving those goals.

The *Taxonomy of Educational Objectives* is not without its critics. Dressel (1976), for example, has criticized the separation of the cognitive from the affective domain, arguing that values underlie the selection of knowledge both by the learner (what the student selects to remember) and by the teacher (what he or she chooses to present and to emphasize). Heywood (1976, p. 165) has unfavorably contrasted the *Taxonomy* with the implicit taxonomies of instructional objectives found in certain works within each discipline or field.

> It is, in my view, much better to use the language (manner of thinking) of the subject than to impose the arbitrary divisions of the *Taxonomy*, for the teacher's intellectual and emotional commitment is to the terminology and literature (what has been said from time to time) of that language.
>
> It is difficult to imagine a *Taxonomy of Medical Education* which would not have *diagnosis* as a main title. . . . Equally, it is difficult to imagine a *Taxonomy of English Literature* which would not include *creativity*, or *fluency*, or *originality*.

Examination of the existing curriculum—A statement of goals and objectives frequently can be derived by working backward from the

existing curriculum. This approach involves a careful examination of current course syllabi and reading lists, lecture notes, handouts, and audiovisual materials. It can be augmented by interviews or surveys of individual faculty members about the knowledge and skills covered in their courses.

Although time-consuming, such a study can illuminate areas of strength and weakness, omission and redundancy, as well as provide an overall sense of how well existing courses are being articulated into a coherent whole.

The engineering faculty at UCLA used this approach to identify major concepts in all relevant engineering, mathematics, chemistry, and physics courses (Lancaster 1974, pp. 272-285). They developed ten major headings: *principle, law, precept, concept, definition, analysis or synthesis, skills, tool, factual data,* and *application.* For each course taken by engineering students, they recorded exactly what was covered under each of the ten headings. From this analysis they realized that the courses were not balanced in difficulty. Some courses consisted mainly of facts, others mainly of concepts. Some had no application, others incorporated few precepts, laws, or principles.

> It was evident some fundamental ideas and basic principles were being taught too late, while the freshman year had some principles that were too difficult. Hooke's Law was taught seven times as though it had never been taught before (Lancaster 1974, p. 278).

This approach provided the engineering faculty with good detailed information on what the unstated goals and emphases of the curriculum had been and gave them a clearer sense of direction for making subsequent curriculum revisions.

At a more global level, an institutional self-study at SUNY, Stony Brook, which had revealed a widespread mismatch in faculty and student expectations of one another, was used to design a set of new undergraduate curricula. These curricula are called Federated Learning Communities (FLCs) because they federate already existing courses in a thematic and interdisciplinary way. In correspondence between the project director, Patrick Hill, and the head of the Curriculum Committee, the response of the FLC curricula is set forth.

> The FLC project addresses the major problems identified in Stony Brook's Self-Study of Undergraduate Education: the incoherence, fragmentation, and atomization of the modern curriculum as well as the impersonality and remoteness of large educational institutions. The mechanisms employed by FLC are novel, *integrative, bridging,* and *advising* structures.

Integration is achieved through federating related courses from different disciplines. Bridging is accomplished through a "Master Learner," who is a tenured faculty member relatively inexpert in the subject matter of the FLC. The Master Learner acts as a "model" student for the other students, a discussion leader, and an internal evaluator and liaison between faculty members and students in the program. Advising is also built in as part of the student's independent study project toward the end of the program. FLCs already implemented or undergoing development include one on World Hunger that involves faculty members from biology, economics, philosophy, English, political science, and sociology.

Goals developed by disciplinary associations—A few disciplinary and professional associations have set up task forces to develop goals and objectives for their subject fields. These can be especially useful resources in the design of a new curriculum in the same field, but they can also serve as models for stimulating faculty members to think about analogous goals and objectives in other subject fields.

For example, the Mathematics Association of America has described in detail what courses should be offered and in what sequence, as well as the topics that should be covered within each course. This is, of course, much easier to do in a highly structured and codified discipline like mathematics than in less structured fields. The American Physiological Society has compiled a booklet, "Educational Objectives in Physiology," which lists topics commonly included in a physiology curriculum, based on a set of objectives developed at the University of Arahus in Denmark. Similarly, the European Community Biologists Association has identified skills, topics, and attitudes for postsecondary biology curricula, based on a survey of current curricular practices at major European universities.

Several disciplinary associations have collected or developed a range of curricular aids. The American Sociological Association has compiled bibliographies, reports, teaching tips, course syllabi, and other materials related to the sociology curriculum. The American Association of Physics Teachers is preparing instructional modules for introductory physics courses. A similar task is being undertaken by the Undergraduate Mathematics and Its Applications Project, funded by the National Science Foundation. This project's charge is to develop modular instructional materials addressed to undergraduate students in science, technology, and engineering.

In the humanities, the Modern Language Association has recently published, "Options for Teaching English: The Undergraduate Cur-

riculum," based on a survey of 23 departments of English. This report offers ideas for curriculum improvements and descriptions of several programs.

Agreeing on Curriculum Goals

Delphi technique—The Delphi Technique lends itself well to use by faculty members in establishing the goals and objectives of a new or revised curriculum. Delphi was created by the RAND Corporation to forecast technological developments, which accounts for its oracular name. The technique, described by Delbecq, Van de Ven, and Gustafson (1975, pp. 10-11), does not require committee members to meet face-to-face. Rather, individuals are surveyed about priorities, goals, and objectives by means of a questionnaire that is mailed to them for completion in private. The results are then summarized by an independent or neutral party, who feeds the information back to the participants. On the basis of the summarized information, individuals are again given the opportunity to revise their own curriculum priorities via a second questionnaire. This new information is summarized once more and fed back to the participants. The number of iterations is not fixed, but depends on the complexity of the topic, the extent of disagreement, and the importance of reaching reasonable consensus.

The particular advantages of the Delphi Technique are that it minimizes the biasing effects of dominant individuals and the amount of irrelevant communication. Each faculty member contributes freely and independently to the original statement of goals; yet, at a later stage, is able to benefit from the contributions of his or her colleagues in setting priorities among the objectives put forth by the entire group. It has been found that regardless of how divergent the original positions, opinions tend to converge and synthesize when this technique is used.

Faculty members in the School of Behavioral and Social Sciences at California State University, San Francisco have used Delphi to determine objectives for the undergraduate major in political science, as part of a Major Assessment Profile, or MAP Project. MAP is an intramurally funded effort to design a collection of test instruments for the periodic measurement of learning outcomes in the political science major. Using Delphi, faculty members and other political science experts were surveyed twice and produced a rank order of instructional objectives. Another of MAP's outcomes is the Political Science Concept Inventory, a universe of over 21,000 political science concepts

or terms grouped into three categories: terms students should know well; terms students should be aware of; and terms students need not know.

Nominal group technique—Like the Delphi process, the Nominal Group Technique (NGT) is a formal way of achieving consensus on a difficult or controversial topic. Unlike Delphi, however, NGT involves a structured, face-to-face meeting of the faculty. Briefly, it operates like this: The meeting begins with individuals writing down curricular goals that are then presented in round-robin fashion, one goal at a time, and recorded on a board. At this point there is no discussion of goals, only the recording of individual ideas. The listing continues until all members indicate they have nothing further to contribute. Goals are then discussed, one at a time, in order to clarify, elaborate, and gauge support. Finally, independent voting takes place, with each individual ranking or rating the goals privately. The group decision is the mathematically pooled outcome of individual votes (See Delbeq, Van de Ven, and Gustafson 1975, for details).

This procedure is effective in making everyone's views known, not just the most outspoken in a group. It has the further advantage of focusing discussion on a single issue at a time, and reducing extraneous debate and discussion. While obviously matters of curriculum are too complex to address in a short space of time, and too important to be decided by vote, a curriculum development committee might find variations on the Nominal Group Technique useful for bringing specific curricular issues to other groups of faculty members so as to broaden the pool of ideas and the base of support for priority goals and objectives.

Decision-theoretic approach—This relatively new approach to group decision-making consists of complex aggregations of value decisions, using Bayesian statistics and utility theory (Edwards, Guttentag, and Snapper 1975). Briefly, the procedure involves the following steps: ranking goals in order of importance; estimating the relative distance between goals; mathematically converting the distances into probabilities; calculating utilities according to a mathematical formula; and making decisions about which utilities to maximize. This approach is quite technical, has not yet been widely used, and is not for the mathematically shy or the faint of heart. It is included here because it represents a way of quantifying a subjective process and might be attractive to faculty members in science departments.

Divide and conquer—Another group discussion approach to establishing goals and objectives for a department was employed at McGill

University (Pascal and Roid 1973). Their approach, which they term "divide and conquer," involves several small groups of faculty in short workshops. Each group generates a list of goals and objectives (in terms of both student and teacher behaviors) for the portion of the curriculum for which they have responsibility. The lists are then combined and circulated for comment by all members of the department. The combined list, including comments, is then brought to a meeting of the total faculty for discussion. One purpose of the approach is to use the goals and objectives for evaluating discrepancies between course descriptions and course intent.

Defining the Ideal Curriculum

One way of approaching curriculum design is to define the "ideal" curriculum. This approach encourages faculty members to fantasize about what their curriculum would look like if there were no constraints of time or money, student abilities and motivation, faculty expertise and commitment, physical facilities or political support. The chief purpose of this approach is to release the creative energies of the faculty and to broaden the discussion from what is known and safe to questions of "What if . . .?" Eickmann and Lee (1976, p. 11) describe this approach, which they have used with faculty members at Syracuse.

> Limiting the component design to an existing view of what is possible probably will result in a new program that merely rearranges the previous one. Developing an ideal design serves several functions: first, it opens the mind to new and exciting possibilities of what may be offered; second, it shows that many of the traditional restraints are unnecessary and in some instances only part of the designer's imagination.

Questions that a discussion of the ideal curriculum might address include:

(1) Who would the curriculum be for? (A conceptualization of the ideal student before, during, and after exposure to the curriculum.)

(2) What would be included in the content of the new curriculum? (Key concepts, core courses, themes, electives, requirements, etc.)

(3) How would the curriculum be organized and integrated? (Blocks of time, modules, intensive courses, year-long courses, articulation and sequencing problems, etc.)

(4) Who would teach the curriculum? (Characteristics and expertise of faculty members, use of teaching assistants, working professionals or community leaders, etc.)

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(5) How would the curriculum be taught? (Lecture-discussion, audio-tutorial, self-paced/mastery-learning, CAI, television, film, or multi-media, etc.)

(6) What would be the overall philosophical justification for the curriculum design? (Use of curricular models, learning theories, research on teaching and learning, etc.)

Analysis of the key elements of the ideal curriculum and the various "real world" constraints can result in an "optimal" curriculum that may include more innovative and promising features than it would have if the constraints had been considered alone. The chief problem with the ideal curriculum approach seems to be the initial hesitancy of faculty members to spend time in creative supposition before knuckling down to the task of designing the "optimal" curriculum. Like the other design techniques we describe, the ideal curriculum approach will be attractive to some faculty members and an anathema to others. Faculty members who are interested in the ideal approach may find some of the exercises described by Bergquist and Phillips (1977, pp. 124-154)—especially their "Dial-a-Course" exercise—useful ways to begin a discussion of the ideal curriculum.

Considering constraints on the ideal curriculum—Whether or not one begins with a discussion of the "ideal" curriculum, identifying the constraints affecting a curriculum is a necessary component of a realistic or "optimal" design. Of course, many factors beyond the control of curriculum developers will affect the curriculum design, and these will vary from institution to institution. Certain constraints, however, are common across colleges and universities, and their impact on the curriculum should be explored and modifications made either in the curriculum design or in the institutional constraints placed on it. Some of the more common constraints include:

(1) The relationship of the proposed curriculum to the mission and priorities of the institution as a whole. How well will the new or revised curriculum interface with those of other departments? With general education requirements?

(2) Financial resources available for developing, implementing, and operating the proposed curriculum. If the new curriculum will take money to implement, what resources might be tapped?

(3) Existing facilities. Will there be adequate classroom space, library holdings, access to computers, access to video and other media-viewing facilities?

(4) Faculty expertise, interests, and commitment. Will it be pos-

sible to reassign faculty to teach the new curriculum or will new positions be required? Is adding FTE feasible? Does the curriculum depend on revolving faculty assignments? How many faculty members are interested in participating?

(5) Student characteristics. What are the interests, abilities, prior preparation levels, career or educational plans of potential students? How much time will potential students be likely to devote to the curriculum? Do they work? Do they commute?

(6) Enrollment patterns in similar programs and departments. Is there likely to be duplication or overlap with other program offerings on campus? Have those departments been consulted? Are they likely to have experiences to share?

(7) The amount of time faculty members have available for the design and implementation of the program. Is release-time required? Feasible? What is the target date for implementing the new curriculum?

(8) Articulation with high schools and community colleges. Does the new curriculum presuppose that students have requisite knowledge and skills? Is it likely to duplicate course work of transfer students?

(9) The political atmosphere of the campus. Is there a commitment to support the new curriculum on the part of administrators? What are the views of senior faculty members in the departments? What key academic senate committees will have to approve the new curriculum? Have they been consulted?

(10) Cost-benefit or value-added aspects of the new curriculum. Will the nature and magnitude of change in student learning be worth the level of resources expended in designing and implementing the new curriculum? What will be the opportunity costs for students? What are likely to be the trade-offs and pay-offs of the new curriculum when compared to the existing curriculum?

Defining the optimal curriculum—At this point a faculty committee begins to work at achieving the best fit between an "ideal" curriculum and the constraints placed on it. Perhaps decisions are made to use certain course offerings in other departments, rather than to build the new curriculum from scratch, or to borrow and modify curricular materials from other institutions rather than develop them locally. Prerequisites may be modified in light of the reality of student abilities, or changes might be made in certain institutional constraints—for example, to allow courses to be offered for

variable credit. Or, in the absence of sufficient local resources, consortium arrangements might be worked out that allow students to take some components of the new curriculum at a neighboring institution.

Anticipating and Overcoming Resistance

We have described some of the obstacles to curriculum change and some of the pressures and opportunities for change. Ironically, many of the same factors that under one set of circumstances act as barriers to curricular change can and do operate as forces for change under a different set of conditions. Faculty members are often cited as the principal obstacles to change; yet faculty members can and do initiate major curricular reforms. Clearly, we know very little about the particular combination of circumstances that lead one group of faculty to successfully undertake a major curriculum revision and another group to continue to "make do," long after their curriculum has lost any semblance of coherence. Unfortunately, the extensive literature on change has not been well integrated with that on curriculum.

Theories and empirical findings about institutional change are most relevant to the implementation stage of a curriculum design project, and strategies for implementation should be carefully planned in advance. As the Carnegie Foundation (1977, p. 16) has stated it: "Curriculum reform of significance requires overall thought but piecemeal action; overall action tends to lead to overall resistance." While many theorists and consultants have offered recipes, tips, and techniques for implementing change, it should be recognized that what are termed "practical difficulties" are in reality complex human phenomena. Nevertheless, some cautionary notes that incorporate general principles and findings about change can be helpful as a checklist for planning the implementation of a new or revised curriculum.

Watson (1961, pp. 469-497) has succinctly summarized some of the principles for overcoming resistance to change. We have taken the liberty of paraphrasing those as they might relate to a curriculum development project.

Resistance to change will be less if:

(1) the faculty feel that the curriculum design or evaluation project is their own, not one solely devised or imposed by a small group or by outsiders.

(2) the project has the clear support of top administrators.

(3) the faculty see the new or revised curriculum as reducing rather than increasing their present burdens.

(4) the project accords with values and ideals of the faculty.

(5) the new curriculum offers the kind of new teaching experience that interests the faculty.

(6) the faculty feel that their autonomy and their security is not threatened by the new curriculum.

(7) the faculty has joined in the diagnostic efforts that led to the new curriculum and agree what the basic problem is and feel its importance.

(8) the curriculum proposal is adopted by consensual group decision.

(9) the proponents of the new curriculum are able to empathize with opponents, recognize valid objections, and take steps to relieve unnecessary fears.

(10) provision is made for feedback on the project and for further clarification as needed.

(11) participants experience acceptance, support, trust, and confidence in their relations with one another.

(12) the project is kept open to revisions and reconsideration if experience indicates that changes would be desirable.

In general, these principles can be thought of as reminders to include as many faculty members as possible in some consultative or design role as early as possible, so that they come to feel that the project is in some measure "theirs," or at least does not come to them as a great surprise.

Lindquist (1977, pp. 152-153) has developed another useful checklist for writing a curriculum proposal so that as many of the principles for overcoming resistance are incorporated into the document itself. He calls this checklist, "Presentation Guidelines." It includes such factors as the relative advantage of the proposed new curriculum and its compatibility with existing organizational structures, academic standards, and facilities. Under each presentation guideline, he lists a set of questions that one might ask of the proposal. For example, under the guideline, *divisibility,* he asks:

> Do we have to accept the whole thing at once? A proposal which says, here are the things which must be done right away, here are desirable things that should be adopted soon, and here are next steps worth keeping in mind, has a good chance if the essentials are not overwhelming (p. 152).

Establishing a Timetable for Implementation

Because curriculum changes require the cooperation of faculty members, who typically have heavy schedules and competing commitments for their time, an implementation plan should include a timetable that pinpoints individual responsibilities and estimated completion dates for various curriculum development components. This timetable, widely circulated, can keep everyone informed about the order of occurrence of major activities.

Two timetable management strategies useful for analyzing, planning, and scheduling the implementation process are PERT (Project Evaluation and Review Technique) and Critical Path Analysis. Although these techniques were originally developed for the Office of Naval Research, they have found widespread application in both business and education. These time-management tools can be useful in the design and the evaluation stages of a project as well as in the implementation phase.

Critical Path Analysis and PERT follow a similar model, which consists of breaking a project into its component parts or activities, estimating the expected time to perform each activity, determining which events are "critical," and graphically representing the subactivities in terms of specific target dates. PERT, slightly more complex than the Critical Path method, statistically treats the uncertainty in activity completion time by including estimates of the probability of meeting specified scheduled dates at various stages in the project.

These management methods have several advantages. At a glance, one can see how individual activities are related to the total project and which tasks need to be accomplished by what deadlines for the project to meet its target date. Although the timelines do take some effort to develop, the more complex the project, the more likely it is that these methods will be well worthwhile. Several good descriptions of how to develop and use PERT and Critical Path Analysis can be found in Wiest and Levy (1969) and Wagner (1973).

The Critical Path method has been successfully used by the University of Nebraska, Lincoln, to organize the schedule of events for their annual reviews of academic departments. Important dates, major activities, and key personnel involved in various tasks are graphically described so that progress can be accurately monitored and the review meet its schedule.

PERT is particularly appropriate for projects whose activities are subject to considerable uncertainty about performance time. Wagner describes and illustrates how PERT has been used in program plan-

ning and implementation at Educational Testing Service.

In addition to using time-management techniques, it is useful to develop contingency plans for a range of possible outcomes during the implementation phase. For example, anticipating what will happen if a new course offering is oversubscribed, undersubscribed, or composed of students totally different from those who had been expected, can minimize a sense of crisis later on. Of course, not all problems can be anticipated, but the more speculation and planning that occurs at this juncture, the more smoothly the implementation process will flow as it progresses.

Curriculum Evaluation

That curriculum design and evaluation are closely related processes has been a recurring theme of this monograph. Evaluation is most useful if it is woven into the design process from the beginning. In the section on Evaluation as Needs Assessment, we have shown how a variety of specific evaluation and needs assessment techniques can be helpful in determining (1) whether a new curriculum is needed or (2) whether an existing curriculum needs to be revised. Heretofore, most evaluations of existing curricula have followed a post-facto design simply because little or no information was gathered on the initial purposes of the curriculum, how it was implemented, or the characteristics of the students entering the program as well as leaving it. Ideally, of course, such evaluations would not be post facto at all, but would include information gathered at several stages of the curriculum from its beginnings to its maturity.

Most evaluators make the distinction between formative and summative evaluation (Scriven 1967, pp. 40-43). The purpose of formative evaluation is to help in making decisions about program modification, usually by those actively involved in its design and implementation. Formative evaluation typically occurs at the early stages of the curriculum. The purpose of summative evaluation is to assess the overall effectiveness of a curriculum so that decisions about continuation, expansion, institutionalization, or elimination can be made. Summative evaluation is generally addressed to an external audience, e.g., top administrators, funding agencies, etc., and is often conducted in whole or in part by persons not directly involved in the design and implementation. Although summative evaluation is typically reported sometime after the curriculum has been implemented, at its best, it begins with the design process itself. As Stake (1976, p. 19) characterizes it, "when the cook tastes the soup, it is formative evaluation, and when the guests taste the soup it is summative." The distinctions are not always clear, however, and as Scriven has noted, good formative evaluation generally approximates summative evaluation.

In this section we address issues and methods involved in planning and conducting evaluations that are built into a new curriculum project from its earliest design stages through its implementation and maturity. Building evaluations into a curriculum project produces

a much richer database and ensures more informed decisionmaking. Systematic, ongoing evaluation, as compared to sporadic or piecemeal efforts, addresses a wider variety of questions and uses a wider range of evaluation methods and information sources. Because it is built into the system, the evaluation is more flexible and adaptive, able to reflect changes in the curriculum design itself and the changing information needs of the designers and decisionmakers.

During the design phase of the project, evaluation plays the role of providing feedback on the curriculum components as they are being developed and planned and on the design process itself. Pretesting curriculum components on a sample of students or getting the judgments of content or curriculum design experts are just two examples. Early evaluation of this kind allows appropriate modifications to be made in curricular materials or instructional formats before the project is too far along to make substantial changes. This kind of formative evaluation is usually conducted by the designers themselves or by an evaluator who works closely with the design team.

Evaluation plays an important role in the implementation stage as well. The first time the new curriculum is offered (in whole or in part) can be thought of as a "field test." As in any field test, there are bound to be problems, some of which will not have been anticipated. For example, difficulties can arise over the appropriate level of curricular materials, the number of students who can be accommodated, or with the amount of advising or tutoring required, or insufficient student access to library holdings, audiovisual materials, or computers. If possible, the first offering of a new curriculum should be regarded as experimental and enrollments limited so that if instructional problems arise, they can be handled on a one-to-one basis by the instructors.

Finally, evaluation plays an important role from the beginning of the first regularly scheduled offering of the curriculum to its maturity. In part, some evaluation strategies followed during the first few years of a new curriculum will also be of a formative nature, that is they will be designed to gather detailed information about the effectiveness of various aspects and components of the curriculum to allow further modifications in materials, formats, prerequisites, advising, etc. At this stage of the curriculum, however, evaluation also begins to address more summative questions about the overall quality and effectiveness of the program. More formal pretest measures of student knowledge, skills, and attitudes may be administered so that comparisons can be made with posttests at a later time. At this point, too, the

evaluation begins to focus on how well the curriculum is meeting both its own stated goals and the expectations of others and how it compares with the previous curriculum or with similar curricula elsewhere.

Empire State College has developed procedures for the ongoing evaluation of its academic program. Called PERC, which stands for Program Effectiveness and Related Costs, the system involves, among other things, collecting a variety of data from students at key points in their educational careers. When students first enter the program, they are given standardized tests (the ETS Area tests) and complete a biographical inventory. At various stages in their studies, students complete questionnaires assessing their educational objectives, reactions to the program, and overall satisfaction. Student documents are subjected to content analysis to supplement self-reported information. Attrition surveys are administered to those who drop out of the program to get information about both the positive and the negative effects of the program. At graduation students complete a questionnaire that assesses their reactions to the program and the extent to which they achieved their own educational goals and objectives. Another series of standardized tests and a personal interview are also part of the graduation year. Then, two or more years after graduation, alumni are surveyed regarding their activities and their retrospective judgments about the program overall. Copies of the instruments used at each stage and a detailed discussion of how the data are analyzed can be found in the PERC Handbook (Palola et al. 1977).

Another comprehensive set of evaluation procedures is being used in the evaluation of Inteflex at the University of Michigan. This program offers a combined undergraduate and medical degree in six years. The evaluation includes several surveys administered prior to a student's enrollment (the Omnibus Personality Inventory and questionnaires about students goals and expectations) and standardized tests and additional surveys at the end of each of the six years of study. Finally, follow-up studies after graduation complete the evaluation process.

Sound, useful evaluation does not follow a formula. It is not a matter of following a series of predetermined steps or routinely gathering and analyzing data. Evaluation, like curriculum, is not a unitary concept; it is a cluster of activities undertaken to judge the worth or merit of something or for making decisions about it. Although it may involve measurement and borrow methods and tools

from the social sciences, evaluation is a much broader endeavor designed to inform human judgments and decisionmaking. Like any human undertaking, evaluation is far from infallible. The credibility and usefulness of evaluations can be substantially improved, however, if they are thoughtfully planned and implemented. Five important aspects of systematic curriculum evaluation are discussed in this section: (1) determining the purposes and intended uses of the evaluation; (2) deciding who should conduct the evaluation; (3) selecting evaluation models; and (4) formulating evaluation questions and identifying sources of data; and (5) collecting comparative or baseline data.

Determining the Purposes and Intended Uses of the Evaluation

As Weiss (1972, p. 15) points out, "the all-purpose evaluation is a myth. Although a number of different types of questions can be considered within the bounds of a single study . . . not even the best planned study will provide information on all the questions that people will think of." Anderson and Ball (1978, pp. 14-42) have discussed at length some of the major purposes of evaluation. Because no evaluation can answer all of the questions different groups might have, it is especially important to decide the major purposes, audiences, and intended uses of the evaluation as early as possible. Generally, that means consulting with key individuals and groups who have a vested interest in the curriculum or who are in a position to make decisions about its continuation, its expansion, or its institutionalization.

An evaluation designed without reference to the audiences and the various uses it might serve is likely to be an evaluation that ends up satisfying no one's information needs and drawing heavy criticism from several quarters.

When thinking through the kind of evaluation best suited for a given curriculum project, we start by asking a series of questions, such as:

- How, when, and why was the curriculum developed? What are its major purposes? What kinds of students does it admit? What do the students do with their education once completed? What are they expected to know or do?

- Why is the curriculum being evaluated now? Who will see the evaluation report? Who will make decisions?

The intent of these questions is to provide a sound historical context

for examining the curriculum. In some cases existing data sources can be used to answer these questions, even when the data were collected for other purposes. For example, information collected on students at the time of application for admission to a program can be useful in providing baseline data about the entering population. An examination of minutes from departmental meetings or documents circulated by curriculum committees, as well as the results of previous academic or accreditation reviews, can often provide a rich data source for learning how and why the current curriculum came to be developed and what dissatisfactions and decision choices were made along the way. Other information can be generated from interviews with key faculty members, an analysis of student transcripts, alumni surveys, and information systematically gathered on the placement of graduates of the program in cases where that is feasible:

- Why is the curriculum being evaluated now? Who will see the evaluation report? Who will make decisions about the future of the curriculum? How familiar are the decisionmakers with the curriculum? What are their feelings toward it? What kinds of evidence do they generally regard as reliable? Valid? (For example, do they tend to be more persuaded by quantitative or qualitative data? Data from students or the opinions of highly respected faculty members?)

This set of questions focuses on the decisionmakers and audiences for the report (these are not always the same people). For example, a dean or a senate committee, through its recommendations to a top administrator, may be the decisionmakers, but interested audiences might include current, former, and prospective students, faculty in the same or related programs, employers or community groups, funding agencies, and others.

- What factors will be the most important in making a decision, e.g., costs, student satisfaction, societal need, quality of instruction, compatibility with institutional functioning?

Again, through discussions with key decisionmakers and representative members of other intended audiences for the evaluation, a general picture should emerge about the relevant variables the evaluation should examine. Because no evaluation can address all possible issues or collect all possible kinds of data, such discussions should also help to set priorities among the various evaluation possibilities. For example, if the chief issue is cost-effectiveness, then evidence about societal need is not likely to be helpful in making decisions.

- What general decision alternatives are possible? Discontinuation? Expansion? Modification? Accreditation?

These questions are listed to emphasize the point that there is no one way to evaluate a given program; rather the particular kind of evaluation required is one that adequately addresses the decision-making needs of the faculty members and administrators involved. An evaluation that is undertaken to decide whether a program should be eliminated or merged with another department will require a different approach than one that is conducted to make program improvements. There may be more audiences (e.g., faculty teaching in the programs and students enrolled in them) who have a vested interest in the decisions in the former case than in the latter. Before an evaluation is undertaken, there should be a clear understanding of the range of decision alternatives so that data are gathered that respond comparatively to all of the possibilities so that optimal decisions can be reached.

- What is the time-frame for doing the evaluation? Are there fixed deadlines that must be met?

These questions are posed to insure that data reach decisionmakers in a timely manner.

Deciding Who Conducts the Evaluation

In the case of some evaluations, e.g., those conducted by accreditation bodies, there is seldom any choice as to who will conduct the evaluation. Intramural evaluations, however, do permit choices. Options include: evaluation by in-house faculty, evaluation by faculty and a campus consultant, and evaluation by external consultants.

Evaluation by in-house faculty—This is probably the most common mode of evaluation. The faculty who carry out the evaluation have the advantage of intimate knowledge of the curriculum and its functioning. Collectively, they know what aspects or components of the curriculum are most likely to be problematic; they also have a vested interest in the success of the program. The disadvantages are that most faculty members lack the expertise and time to carry out a systematic evaluation, and their vested interest in the curriculum and their close involvement with it may blind them to certain problem areas. Certain aspects of the curriculum may seem so obvious to them that they are not included in the evaluation at all. Moreover, when audiences for the evaluation include persons outside the department or colleges, the credibility of the evaluation becomes para-

mount. In-house evaluations may be given less weight because of the potential biases of the staff.

Evaluation by faculty and campus consultants—As a result of the faculty development movement of the 1970s, a growing number of colleges and universities have faculty or staff experts on evaluation and/or instructional design available to assist with curriculum evaluation efforts. These consultants staff learning resources centers, faculty development centers, test and measurement offices, and institutional research offices. They frequently offer short-term consultation on specific aspects of curriculum design or evaluation or, in some instances, assume a more active and long-term role as a member of a design or evaluation team. For example, at Utah State University, the Center for Instructional Development provided short-term assistance to faculty in Wildlife Sciences. They developed survey instruments to measure the effectiveness of the current curriculum in providing students with technical knowledge, communication and thinking skills, and background and breadth in the field, which were administered to program graduates, employers of graduates, and current faculty.

The Division of Development and Special Projects of the Audio-Visual Center at Indiana University assisted faculty members in Therapeutic Recreation to determine goals for the new program, evaluate the validity of the goals, and design an overall evaluation plan for the new program.

The advantages of the faculty and campus consultant model are that consultants can help faculty members think through the decisions involved in designing a curriculum and its evaluation and contribute their knowledge and expertise about various evaluation strategies and techniques.

Faculty and external consultants—A less common model is for a department or college to employ someone from outside the campus to assist in the evaluation. Departments receiving extramural support for their curriculum projects from governmental or private sources may be required to contract for an external evaluation, or a foundation may itself fund an independent external evaluation. For example, Worcester Polytechnic Institute was the recipient of National Science Foundation funds to redesign its undergraduate curriculum, and an internal evaluator was hired for the project. In addition, NSF funded an external panel to monitor and evaluate curricular changes. Similarly, Grand Valley College IV in Michigan received support from the Fund for the Improvement of Postsecondary

Education, which also contracted with an independent group for a complete evaluation of the college curriculum and functioning.

The primary advantage of external evaluations is the assumption of objectivity, which increases the credibility of the evaluation results. Disadvantages include the possibility that the evaluator has too little knowledge and understanding of the normative environment, personalities, and decisionmaking structures of the institution.

Collecting Comparative or Baseline Data

Whenever possible, evaluation should be comparative. Comparative evaluations provide a standard against which to judge the quality, extent, and costs of a curriculum's effects. Such evaluations require early and careful planning (virtues stressed throughout this monograph) and may be more costly to conduct, but they can provide much more convincing evidence than a single case study.

Comparative evaluations can be conducted in several ways. The comparison can be of the same individuals or groups over time (often referred to as a longitudinal study approach), measuring changes in students from their first year in a program to their graduation and again as alumni to evaluate long-term effects. This method of comparison involves the use of pre- and posttests, although the data gathered need not be of the "test" variety, but might include attitude changes, ratings of competences by faculty members, or observations by evaluators or employers.

In evaluating a revised curriculum, a comparison can be made between the old and the new versions of the curriculum. Faculty members in the psychology department at the University of California, Santa Barbara used this approach, surveying majors before and after new requirements and courses were instituted. Both surveys examined students' aspirations, areas of interests, and attitudes toward the department.

Sometimes it is possible to compare curricula cross-sectionally; that is, a new or revised curriculum is compared to a similar curriculum in the same or a similar institution. The Inteflex, the experimental, six-year medical program at the University of Michigan, uses students in a traditional medical school as a comparison group. Levels of achievement, satisfaction with the program, and postgraduation activities are compared for the Inteflex students and those in the traditional medical school program.

These comparative approaches can be used in combination. For example, faculty members revising an existing curriculum might col-

lect baseline data prior to implementing the changes in order to compare the new to the old; administer pre- and posttests to the students to follow them longitudinally; and collect comparable kinds of data on students in similar programs.

Selecting an Evaluation Model

A number of philosophical and methodological issues are involved in selecting an evaluation design. These issues are reflected in the various evaluation models developed by those nationally prominent in the field over the past 15 years.

Scriven's Goal-Free Evaluation model (1974) involves gathering data on a wide range of *actual* effects and evaluating the importance of these effects in meeting demonstrated needs. In this approach, the evaluator pays no attention to program goals, but rather focuses directly on the effects of the curriculum. By its very nature Goal Free Evaluation requires a person external to the curriculum to conduct the evaluation. This model has had application primarily at the precollege level.

Stufflebeam's Context, Input, Process, Product (CIPP) model (1971) is an elaborate sequenced strategy for the design and evaluation process. This model outlines how a given evaluation could be planned, executed, and recycled. Its widest use has been at the precollege level, although the University of Washington School of Nursing applied its key features to their evaluation of the curriculum.

Parlett and Hamilton's Illuminative Evaluation (1977) uses naturalistic anthropological methods to observe, inquire and explain the curriculum. This approach places less emphasis on determining needs, making comparisons with other curriculum, or using quantitative methodologies. Rather, the method stresses a thorough case study examination of what happened in the curriculum and why, and makes extensive use of observation and interviews. Like Goal Free Evaluation, this model is best conducted by someone external to the design and development efforts. Illuminative evaluation has been used at several colleges and universities, including MIT (Parlett and Dearden 1977). As the result of attending a workshop sponsored by the Lilly Foundation, a number of faculty members applied the illuminative approach to evaluations on their campuses. One such study was of the Freshman Core Course at Goucher College.

Stake's Responsive Evaluation model (1975) emphasizes understanding activities and how they are valued in a given setting from a variety of perspectives. This approach is best used by someone

external to the curriculum development and design process. Responsive evaluation is most closely identified with the evaluation of curricula in the arts.

Eisner's Connoisseur model (1975) draws an analogy of the evaluator as critic who seeks to critically describe and appraise a curriculum. This methodology is probably best used by individuals expert in both the content of the field and the evaluation orientation. Its application has been primarily at the precollege level.

Each model has its strengths and weaknesses, its supporters and detractors. From this brief overview it can be seen that embracing one particular approach in total will uniquely structure the form and nature of the evaluation. Selecting an evaluation model or an external evaluator should be done in close connection with the intended uses and audiences for the evaluation. Different audiences are likely to be interested in different modes of evaluation. For this reason, like most practitioners, we have been rather eclectic in our approach to evaluation. From each of the models, we have selected features that we feel are important to include in the evaluation process described in the next section.

Formulating Evaluation Questions

In many ways a curriculum evaluation is only as good as the questions it addresses and the kinds of data gathered to answer them. Out of the myriad questions that might be examined, those which are most important to decisionmaking by one or another audience should constitute the chief focus of the evaluation. Although many important questions will be unique to a given evaluation, there are several categories of questions that tend to be included in a truly comprehensive curricular evaluation.

Answers to these questions can be sought from a number of sources (faculty, students, employers, advisors, alumni, etc.) and by a variety of techniques (observation, analysis of transcripts, surveys and interviews, etc.). Most of the sources and techniques for evaluating a new curriculum can be found in the earlier section on *Evaluation as Needs Assessment* and will not be repeated here.

The questions, which draw on earlier work by Scriven (1975, 1977), include:

Need for curriculum—(1) How well is the new or revised curriculum meeting identified needs of students, the campus, the profession?

Academic quality of curriculum—(1) Does the curriculum reflect

key issues, recent developments and contemporary ideas dominant in the field? (2) Is the curriculum free of obsolete ideas? Is it up-to-date and accurate? (3) Does it provide adequate coverage of the field? Are all the main essentials being offered? (4) How adequately are the various components of the curriculum integrated? (5) Does a coherent "whole" emerge from an assembly of the various course offerings?

Curriculum practice—(1) How well does actual practice conform to what was planned or expected? What deviations have occurred and why? What, of significance, has happened (good or bad) that wasn't anticipated? (2) Are students progressing through the new or revised curriculum as planned? Are they fulfilling requirements as anticipated? Are they following the established sequence of courses or taking them out of order? (3) Is there a match between catalog descriptions, course and program syllabi and what actually occurs in class? (4) What are the characteristics of students enrolled in the new or revised curriculum? Is the target population the actual population being reached? Are students from other departments making use of the courses? How do enrollment patterns compare with those of the old curriculum? With expectations? (5) Is the changed curriculum just and fair in terms of matching content and procedures for testing and grading? Are there recourses for dissatisfied students and faculty? (6) How adequate is the scheduling of courses? Is the number of required courses appropriate? Are the number of offerings too few, too many or about right given course enrollments and other campus requirements?

Curriculum support—(1) Are advising procedures appropriate to meet the new or revised curriculum changes? Are faculty both within the department and in other departments aware of the changes and transmitting information to students accurately and in a timely manner? (2) Have faculty and TAs received the necessary training or information to adequately implement the changed curriculum? (3) How effectively is the new or revised curriculum being taught by faculty? by TAs?

Effects of the curriculum—(1) What is the effect of the new or revised curriculum on other courses or departments on campus? Are there areas of unnecessary duplication and overlap? (2) How do faculty, students, and administrators feel about the changed curriculum? What is their level of satisfaction? their suggestions for modification? (3) How well are students learning the curriculum? Is there any difference in student performance under the new or re-

vised curriculum when compared to the old curriculum or some other appropriate alternative? What are the long-term or transfer effects of the curriculum on student learning? (4) Do faculty have an overall view of the curriculum and where their specific courses fit in? Do they understand and accept the assumptions and principles on which the curriculum is based? (5) How do recent graduates view the new or revised curriculum and its relationship to their present career or educational activities? (6) What are the long-term effects of the curriculum (job placement of graduates, etc.)? What are some unintended or unexpected effects of the program? (7) What do archival data say about the new or revised curriculum (attrition, number of graduates, length of time to degree, student credit hours, etc.)?

Cost of the curriculum—(1) What are the human and fiscal costs of the new or revised curriculum? Student and faculty time? Impact on library, media, counseling services?

Institutionalization of curriculum—(1) Has a system been implemented to allow periodic review and restructuring of the new or revised curriculum? How well is that system working? (2) What opportunities for change, improvement, expansion, contraction, efficiency, etc. in the operation of the curriculum can be identified and justified? (3) If the new curriculum is regarded as experimental, what is the likelihood of its finding a permanent home within the structure of the university as well as permanent funding?

Summary

Although the 1970s have brought renewed interest in the curricula of higher education, knowledge about the processes and methods of curriculum design and evaluation continue to be neglected in the literature. This is unfortunate because as the costs of higher education continue to rise, external pressures for more systematic approaches to curriculum decisionmaking will no doubt increase. The competition for reduced or steady-state funds within institutions also heightens the need for better ways of evaluating curricular quality and cost-effectiveness.

Administrators and faculty members are increasingly asked to provide such information; yet few of them have been trained in systematic approaches to curriculum design and evaluation, and there are few guides to assist them. What literature does exist is widely scattered in theories of change, the research methodology of the various social sciences, policy research, small group techniques used in industry, and the field of instructional design.

In this monograph, we have tried to identify many of these resources and to discuss them in terms of their practical relevance in designing and evaluating curricula. Whenever possible, we inserted case-study examples to illustrate the use of these techniques and approaches at the higher education level. In many sections of the monograph we have also provided checklists that might be helpful to a group of faculty members involved in assessing the need for a new or revised curriculum or designing, implementing, and evaluating a new curriculum. Finally, throughout, we have stressed the interrelated, interactive nature of the design and evaluation processes. Each process implies or anticipates the other as soon as one begins to approach the process systematically.

Although the monograph is far from being the *definitive* work on curriculum design and evaluation, we hope it contributes to more focused inquiry into the subject. As a topic of research, the curricula of higher education are too important to be neglected.

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